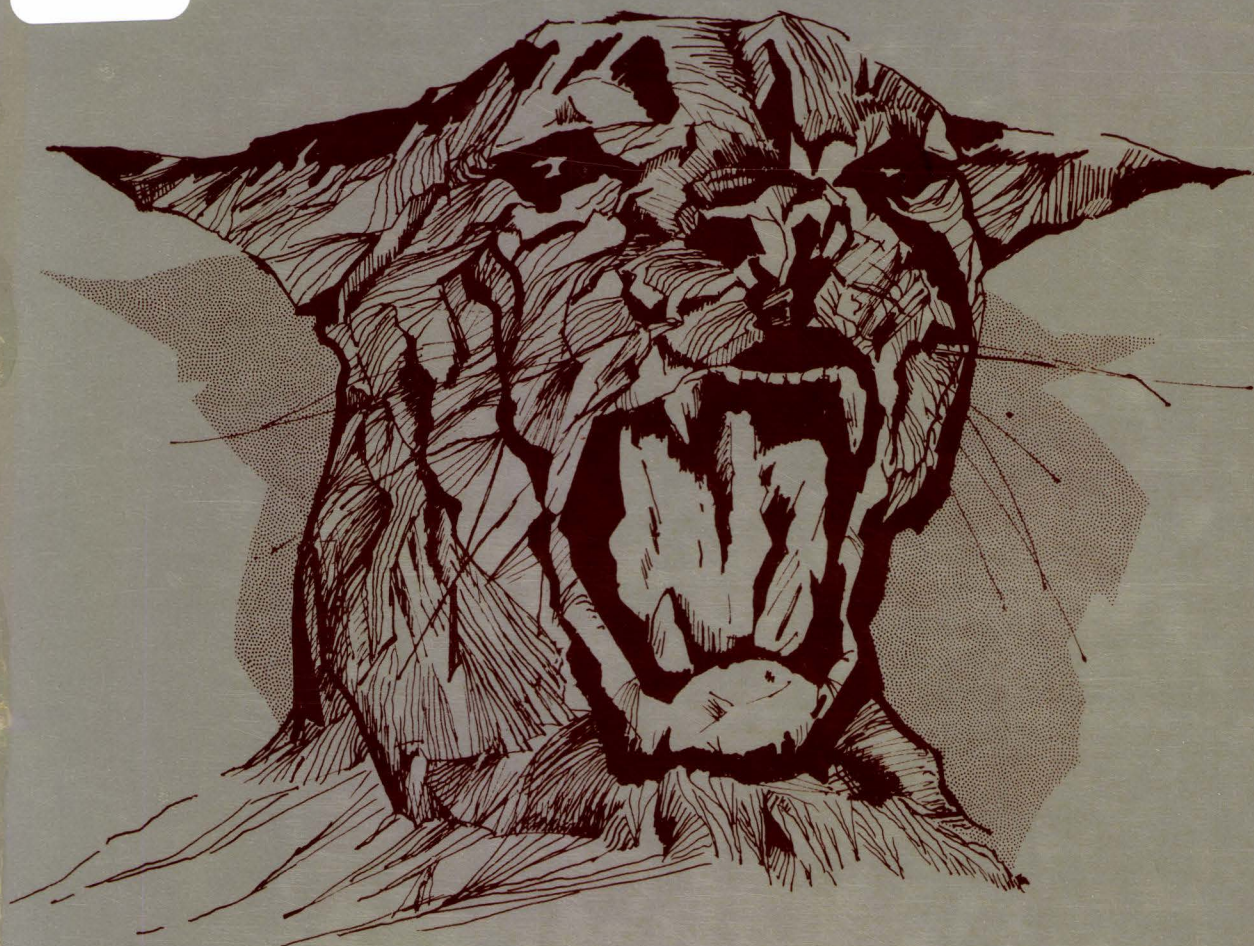


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WILDLIFE MANAGEMENT PLAN

**unit
27**

Apache National Forest .

Wildlife Management Plan

Unit 27

May, 1970

Duplicate

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APACHE NATIONAL FOREST

WILDLIFE MANAGEMENT PLAN

UNIT 27

(ARIZONA)

Eagle Creek - Mule Creek

A 10 year Wildlife Habitat Management Plan

WILDLIFE MANAGEMENT PLAN

UNIT 27

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I. Introduction

This Wildlife Management Plan is primarily concerned with five major areas. These are:

- (1) Maintenance and improvement of existing habitat.
- (2) Restoration of destroyed and damaged habitat.
- (3) Coordination with all other Forest resource uses.
- (4) Coordination with land management of other agencies.
- (5) Coordination with the State Game and Fish Department.

Game Management Unit 27 is located in east central Arizona. It was classified as a Game Management Unit by the Game and Fish Commission Order P-37 on May 24, 1969.



Unit 27 - general view towards sandrock country

The Unit boundaries are: on the east the New Mexico-Arizona State line, on the south by the Apache National Forest boundary, on the west by the San Carlos Indian Reservation--Forest Service boundary, on the north by the Mogollon Rim and east to Blue Lookout, Raspberry Peak, Crooks Mesa, Bear Canyon, Anger Peak, Bear Mountain and continues along the Mogollon Rim to the New Mexico-Arizona State line.

The entire management unit lies within the south portion of the Apache National Forest. There are approximately 519,000 acres in the Unit with 5,900 acres in private ownership and 513,100 acres of National Forest land. The Clifton Ranger District contains 505,000 acres and the Black River District 14,000 acres within the Unit.

Approximately 88,000 acres of the proposed Blue Range Wilderness will be in the Unit.

Clifton and Morenci, with a combined estimated population of 10,000 are the closest communities to the Unit. The entire Unit is located in Greenlee County with the County Seat in Clifton.

Topography of the Unit is quite variable. Some of the roughest and most remote terrain on the Apache is in the Unit. The Mogollon Rim (a geologic fault) forms the north boundary. From here the topography falls sharply for about 1,500 feet into the Blue River and 1,000 feet into East Eagle Creek. The Blue River on the east side of the Unit runs from north to south until it empties into the San Francisco River. The San Francisco River enters the Unit from the northeast and flows in an east to west direction. Eagle Creek on the west side of the Unit flows from north to south. Eagle Creek goes through an open grass covered valley while the Blue and San Francisco River Canyons are rough and precipitous.



Grass cover in Eagle Creek



Rough topography of San Francisco River

Between the Blue River and Eagle Creek the topography below the Rim gradually rises to form the mountains from Rose to Maple Peaks. From here the country undulates erratically through plateaus, rough canyons, and lesser mountains to the south boundary.

Elevations range from 3,600 feet on the San Francisco River to 9,534 feet on Blue Mountain.



Red Mountain in the background from Raspberry Canyon

Soils are quite variable throughout the Unit. Exposed parent materials of limestone, sandstone, shales, conglomerates, granite and basalt are evident. Soils are mostly shallow and rocky with low to moderate productive capacity. Surface rock is common. Erosion is a serious management problem due to the thin, unstable soil conditions and past overgrazing. Soils in some of the higher mountains are shallow clay loams with loose surface malpais and limestone rock. Sandy and sandy clay loams prevail in the bottom of the canyon drainages.



Sardine Canyon showing rough terrain and poor soil cover.

Climate varies from moderately severe near the Rim to mild in the south. Precipitation ranges from 30 inches near the Rim to 12 inches in the lower elevations. The Eagle Creek station at 4,975 feet shows an average of 15.71 inches of annual precipitation.

Approximately 60 percent of the total precipitation near the Rim comes in the form of rain. The snowpack occasionally reaches three feet in this area; however, the snow melts rapidly on the south slopes.

In the lower elevations approximately 95% of the moisture is from rainfall. This primarily occurs in the form of intense thunderstorms during July, August, and September. April, May, June, October, and November are generally very dry. High velocity winds are common in the spring.



Mixed semi-desert type in the south part of the Unit.

The allowable annual cut of timber is 1 MMBF. Nearly all of the accessible timber has been selectively harvested. In 1968 approximately 1.5 MMBF was sold and removed. Since that time no additional timber has been sold.

Range management is one of the largest resource activities in the Unit. There are 26 grazing allotments and all are grazed yearlong. Deferred grazing management is in effect on approximately 1/3 of the allotments.

Fires are common and have averaged 27 per year. Burning conditions build up during May, June and early July. During this period dry lightning storms pass through the area. Large fires have been common especially in the ponderosa type due to lack of access.

There are several variable vegetative types which are somewhat limited by elevation, aspect, precipitation and soils. Pinyon-juniper, chaparral, semi-desert grassland and shrub dominate most of the vegetative types in the unit.



Vegetative contrast between semi-desert grassland and pinyon-juniper type.

Mixed conifer and ponderosa occur in the higher portions. Scattered throughout this area is chaparral, pinyon-juniper, mountain mahogany, and oak.



Live oak and pinyon-juniper zone

The woodland area comprises approximately 70 percent of the total unit acreage. Within the woodland area is the mountain chaparral. Mountain mahogany, Gambel oak, garrya, desert ceanothus, cliffrose and four live oak are the primary plants in this type. Blue and side oats grama are common grasses. Pinyon-juniper is scattered.



Mahogany oak grassland on Bullard Peak

Semi-desert grassland and shrubs occupy most of the southern half of the Unit. Mesquite, caliandra, yucca, cressote bush, mimosa, bear grass and the live oaks are common. Sideoats, bluegrama and curly mesquite are the primary grasses.



Semi-desert grassland in southern part of Unit.

River bottom hardwoods are present; however, they are limited in range.

Cottonwood, sycamore, ash, walnut and alder occur along the major watersheds.

Access in the Unit is very limited. Highway 666 bisects the Unit from the Mogollon Rim to Clifton. This highway is scheduled for realignment and will be a much needed improvement. Several roadside rest areas are along the highway and are often used as hunting camps. U.S. Highway 78 enters the Unit from the east in the southern tip of the Unit. Juan Miller Road and the Eagle Creek Road are the only secondary roads that provide normal access. There are a few 4-wheel drive roads which provide some access. A large portion of the Unit can only be traveled by foot or horseback.

II. Policy and Guides

The existing policies on the Apache National Forest are consistent with the Regional and Washington Office guides.

A. Authority to manage wildlife habitat

1. Granted to the Secretary of Agriculture under the Act of June 4, 1897.
2. Transfer Act of February 1, 1905.
3. Multiple Use-Sustained Yield Act of June 12, 1960.

B. The National Forest Wildlife Management Policy

1. Retain and improve high recreational values of National Forest by employing natural rather than artificial management procedures as fully as practicable.
2. Encourage natural populations of wildlife species except where one species can be favored over another to increase recreational values.
3. Provide, in cooperation with the State, hunting and fishing areas suitable to the varying needs, interests, and skills of the public. The intent being to retain some areas managed for quality of experience rather than numbers of participants.

C. The basic cooperative relations policy at the National level is:

1. Cooperate with the State and other agencies involved in wildlife management.
2. Promote cooperatively financed wildlife habitat improvement projects on National Forests.

As a broad guideline, the Forest Service will assume leadership in all vegetative phases of habitat improvement work, while the states will assume leadership on structural improvements in habitat development.



Browse transects are one example of cooperative work policy.

The basic cooperative relations policy at the Regional level is:

- a. Maintain close relationships with persons and organizations interested in National Forest wildlife.
- b. Establish cooperative agreements with States.
- c. Participate in important State-Forest Service meetings.

At the District Ranger level this involves close cooperative relations with the State and a united front in public relations activities.

D. Objective

1. The National Forest Wildlife Management objective is to manage habitat so that wildlife populations, including non game species, will be maintained at a level consistent with the requirements for other services of the land and recreational and related public uses and values.

E. Agreements with cooperators that are in effect.

1. A cooperative agreement between the Arizona Game & Fish Commission and the U. S. Forest Service was drafted in 1958 and amended on February 24, 1965.
2. Memorandum of Understanding between the Arizona Game and Fish Commission, U. S. Forest Service, and the Rocky Mountain Forest and Range Experiment Station dated June 25, 1958.
3. Cooperative Agreement between the Arizona Game and Fish Department dated October 4, 1960 and is a supplement to item #1 above.
4. Bureau of Sport Fisheries and Wildlife concerning predator and rodent control.
5. Wildlife Coordination Act concerning construction of water impoundments as a Dingell-Johnson project.

F. Annual and Special Meetings

There are two general meetings held annually. The first meeting is usually in February or March. At this meeting the Forest Service and the State Game and Fish Department outline their respective work programs for the year. A general discussion usually follows concerning any items of current interest.

The second annual meeting is held in April or May. This meeting covers the hunt recommendations for the coming year. Bag limits and seasons are usually discussed by both the Forest Service and the Game and Fish Department.

Special meetings are held as needed and usually consist of either a plans-in-hand meeting or an on-the-ground meeting. The Forest Service, Game and Fish Department, BLM and Bureau of Sport Fisheries and Wildlife usually attend the Wildlife Committee meeting of the Arizona Cattlegrower's Association.

III. Management Cooperators

The basic wildlife management cooperating agencies are the Arizona Game and Fish Department and the Bureau of Sport Fisheries and Wildlife.

A. Arizona Game and Fish Department

An intense cooperative approach is needed due to the increasing interest and demand for better wildlife management. With the Forest Service administering the majority of the land in the Unit, a united front with the State Game and Fish Department is essential.



Check Stations are an important cooperative project.

The Clifton District Ranger and his staff are the primary cooperators with the State. In addition to the District personnel, the Forest Wildlife Biologist and Range and Wildlife Staff are involved.

Terry Starner is the Wildlife Manager for Unit 27 and is stationed in Safford. Don Wingfield is the Regional Supervisor for Region VII and lives at the Cluff Ranch near Pima. These two people are the primary contacts for wildlife work in the Unit.

The following are areas that should receive basic cooperative efforts between both agencies:

1. Checking Stations
2. Law Enforcement Patrols
3. Hunter contacts
4. Big Game Range Analysis studies
5. Wildlife Habitat Improvement projects
6. Stream Surveys and inventories
7. Water quality monitoring
8. Stream Rehabilitation and Stabilization
9. Big Game Classification Counts
10. Inter-Agency Meetings
11. Sportsman and Gun Clubs
12. Fire Prevention and Suppression
13. Cooperative Research
14. Administrative Studies
15. Wildlife Management Plans
16. Search and Rescue (lost hunter)
17. Multiple Use Coordination
18. Rare and Endangered Species Information

Regulation W-1

This regulation states that officials of the Forest Service will cooperate with State, County, and Federal Officials in the enforcement of all laws and regulations for the protection of wildlife.

Regulation W-2

This regulation was issued in cooperation with the International Association of Game, Fish and Conservation Commissioners. It was designed to provide a means of cooperative management of wildlife and of maintaining game populations within the capacity of their habitat.

Important responsibilities of the two agencies include:

1. State

- a. Rules and regulations which protect and utilize wildlife. Establishment of seasons, bag limits, special regulations.
- b. Propagation of game and fish.
- c. Technical leadership in the animal phases of fish and game management.
- d. Habitat improvements cooperatively planned and developed with the Forest Service.

2. Forest Service

- a. Management of National Forest wildlife habitat and improvement of habitat through coordination with other forest uses and activities.
- b. Leadership in vegetational phases of habitat development.
- c. Determination of the extent to which National Forest land will be devoted to wildlife purposes.
- d. Regulation of all use (including hunters, fishermen, and trappers) to the extent needed to protect the National Forests and the public from damage and injury.

B. Bureau of Sport Fisheries and Wildlife

The primary cooperative work with the Bureau concerns wildlife populations control and animal damage control. The Rare and Endangered Species classification interest is rapidly growing and the need for cooperative relations in this field is important.



1080 grain used to control rodents.

Rodent control is one type of cooperative work.

The present objective concerning wildlife control programs states that "all forms of native wildlife have a place in National Forest and National Grassland environment. Control will be instigated only when populations threaten public health or safety or cause excessive damage to other resources".

Definite guidelines have been established concerning predator and rodent control. Predator control is discouraged in wilderness areas and on overstocked game ranges except when needed to protect livestock.

Animal control programs will be undertaken only after a field examination has determined that significant damage is occurring and that remedial action is in accord with other Forest resources or uses.



Rodent surveys give an indication of areas needing control work.

The identifying and locating of rare and endangered species is gaining widespread attention. A "Red Book" has been prepared by the Bureau of Sport Fisheries and Wildlife. This book lists the fish and wildlife species that are in danger of extinction or who need to have additional information gathered concerning them.

M. Earl Long, District Field Assistant from Pima, is the local damage control agent with responsibilities in the Unit.

C. Management Cooperators:

Terry Starner	Arizona Game & Fish	Safford
Don Wingfield	" " "	Pima
Rex Hansen	" " "	Eagar
Al LeCount	" " "	Nutriosos
M. Earl Long	Bur. of Sport Fish. &W.L.	Pima
Lon Mangum	" " " " "	St. Johns
Maury Sizer	Past AGF Commissioner	Phoenix
C. Gene Tolle	Arizona Wildlife Federation	Phoenix
Paul Krois	Greenlee County AWF	Clifton
Jack Brooks	Rancher	Blue
Ron Harrington	Adv. Board, Sheriff's Posse	Clifton
Fred Carrol	Past Sheriff	Clifton
William Quinsler	Grazing Advisory Board	Phoenix
Forrest Wilkerson	Greenlee County Sheriff	Clifton
Fred Fritz	Grazing Advisory Board	Sandrock Ranch
		Clifton
Darrell Elmer	Highway Patrolman	Clifton
Ed Pfeifer	Morenci Gun Club	Morenci
Fred Winkler	" " "	"
Harlon Green	Coronado Trail Sportsman	Clifton
Lloyd Fernandez	County Attorney	Clifton
Ross Ewing	Past License Dealer	Clifton
J. J. Lovett	Doctor	Clifton
Henry Marquez	Justice of the Peace	Clifton
Clell Lee	Guide	Blue
John Joy	Guide	Blue
Hallis Williams	Lion Hunter	Morenci
Ted Ferguson	Predator Hunter	Clifton
John Gray, Jr.	Predator Hunter, Rancher	Clifton
Royce McGaha	Phelps Dodge	Morenci
Wylie Boyd	Duncan Mercantile	Duncan
Pete Maldonado	Barber Shop	Clifton
Don Sorells	Scout Leader, Ins. Salesman	Clifton
George & Lavon Webster	Garage	Clifton

IV. Special Problems

The lack of access into Unit 27 creates several problems. Hunter distribution is primarily confined to the few roads and jeep trails. This results in light pressure in many areas; however, horseback hunting appears to be increasing. Classification of the Blue Range will probably attract more horseback hunting and guided hunting trips.

The infestation of the parasite Elaeophora schneideri in both elk and deer is a current problem. Research is underway to determine the life cycles of the intermediate hosts. This parasite eventually gets into the bloodstream of both deer and elk where it can cause blindness. Elk seem to be affected more by the parasite than deer.



Examining elk for bloodworm parasite.

Competition between livestock and wildlife occurs due to yearlong grazing of cattle. The trend toward placing all allotments under an intensive management system should reduce the competition.

The overall effect of air pollution from the Morenci-Clifton smelters warrants research. Browse and forb damage, limit of animal tolerability and effect on distribution are some items that may be affected.



Air pollution from mines.

The location of several new copper mining explorations within the Unit could have a tremendous impact on wildlife. Low grade ore and the resulting open pit mining (if approved) will necessitate intense multiple use coordination and regulation.

Modern fire control techniques have created some special problems. Wildfires in the past have maintained a grassland-chaparral complex over a large portion of the Unit. Better fire control has resulted in the invasion of mixed pinyon-juniper and other conifers. Future fire control based on land values could reverse this pattern and create a more favorable habitat for wildlife.

During hard winters the influx of elk can create problems. Early snows in the high country force the elk off the Rim into the Unit. This usually results in a higher elk harvest and poorer hunter distribution. Heavy snows after the hunting season usually cause a lower harvest and concentrations of elk.

Predators and the interest they create are not unique to the Unit. The low population of people and lack of human access seems to compliment the predators. Ranchers in the Unit basically feel that predators, especially coyotes, lions and bear are the cause of many livestock deaths and the low numbers of deer.

The overlap of the Unit onto two Ranger Districts will require continued communication. The majority of land in the Unit is administered by the Clifton District and there appear to be no special problems.

The classification of the Blue Range Primitive Area will have an affect on habitat projects in the future. Careful evaluation of all projects within the Primitive Area will be mandatory and must conform with established guide lines.

Last but not least is another problem which isn't unique to the Unit. This concerns the status of both whitetail and mule deer. Old records and personal interviews indicate that the whitetail deer were by far the most abundant deer in the Unit. During the last 30 years the trend has reversed to a dominance of mule deer. Coupled with this resulting dominance in mule deer is the decline in the total deer population the last 6-7 years. Considerable research is needed to determine the causes for both fluctuations.



Good whitetail from Unit 27.

V. Multiple Use Correlation

Good multiple use management will enhance the wildlife values of the Unit. Public demand for more and better wildlife management is increasing at a tremendous rate. The value of all wildlife and not just game animals requires the incorporation of sound wildlife principles and needs for all Forest Service projects.

A. Timber Management

Timber management practices in the past have been limited due to lack of timber producing lands, access and the Blue Range Primitive Area. Future work will be somewhat limited for the same reasons. A timber cruise is under way to calculate the volume of timber below the Rim. This will determine if a new access road will be built to tie in Highway 666 and the Eagle Creek road.

The Malay Sale of approximately $\frac{3}{4}$ million feet was sold this year. Items that should be considered in the future timber harvest include:

1. Snag trees for small game birds
2. Turkey roost tree identification and preservation
3. Mast producing Gambel oak protection
4. Leaving of occasional brush piles for small game and birds.
5. Inclusion of forb seed in disturbed site planting mixes
6. Consideration of small clearcuts especially in mistletoe infected areas.
7. Broadcast burning of slash debris
8. Careful evaluation of timber sales in Canyons



Snag tree showing woodpecker activity.

B. Engineering

The new location and future construction of Highway 666 will require good coordination. Road and trail construction projects should include, but not be restricted to the following coordination measures:

1. Locate roads on ridgetops and not in drainage bottoms.
2. Adequate drainage and water bar structures in present and future developments.
3. Include forbs and grasses in all watershed seed mixtures.
4. Close and revegetate all spur roads not needed for access and administration.
5. Install adequate culverts when crossing live water courses.
6. Relocate roads and jeep trails that have excessive grades.
7. Revegetate all disturbed and borrow areas.
8. Locate borrow areas so that future water developments may be installed if possible. Consider fencing and planting with browse and forbs.
9. Locate, identify and mark wildlife crossing routes along new Highway 666.
10. Construct fences that will enhance wildlife movement.

C. Range Management

Range management probably exerts the greatest impact of all resources in the Unit. Approximately 6,000 head of cattle excluding the natural increase, graze year long in the Unit. The emphasis on better range management and practices should directly improve wildlife values. Items of coordination include:

1. Allow for wildlife needs when estimating grazing capacity. Consider the wildlife impact when preparing range management and development plans. The actual carrying capacity for range is often modified by wildlife use. Their needs should be considered.
2. Encourage the inclusion of forbs and browse in all revegetation and type control projects.
3. Cooperatively finance and locate proposed water developments.
4. Install wildlife escape ramps in all watering areas with vertical or steep sides.
5. Plan projects that will increase edge effect and allow for "escape" or travel routes.
6. Evaluate the effects of chemical control projects on desirable forbs and browse.

7. Carefully evaluate the need for predator and rodent control programs.

D. Recreation and Land Uses

1. Coordinate future campsite locations with new Highway 666 and future timber sales.
2. Plan "kick off" sites with water facilities, horse corrals, unloading ramps, etc., for primitive and back country area hunting and exploring.
3. Locate future recreation sites so that pollution will not affect the main water courses.
4. Future powerline clearing and maintenance should provide for leaving brush piles and revegetating all disturbed areas.

E. Watershed Management

The area of watershed and soil management should be of primary importance in the Unit. This will involve coordination measures with all resource values. The current condition of the watershed in the Unit offers unlimited development and improvement possibilities. Past abuse has deteriorated the soil cover and rehabilitation of the watershed will be a slow process.

1. Coordination measures involve the proper stocking of wildlife in the future.
2. Revegetation of all disturbed areas.
3. Close cooperation with all other resource activities.
4. Stream stabilization and in channel control structures.
5. Increase water quality and bottom fauna sampling.
6. Include forb species in all watershed seeding projects.
7. Proper planning in future resource development to include minimum pool for fisheries.



Gabion structure on Blue River

F. Fire Control

One of the most important techniques for improving wildlife habitat concerns fire. This involves the wildfire, maintenance fires and controlled fires. Future concern over air pollution may restrict or limit the amount of burning on National Forest lands. Consideration should be given to the impact fires will have on land values and vegetative types. A large portion of the unit has the potential for controlled fires as a management tool. Consideration should include:

1. Locating helispots in areas that will increase edge effect.
2. Revegetate helispots with desirable forbs and grasses.
3. Retain small nesting areas and brush piles during burning projects.
4. Include desirable grass and forb seed in post fire revegetation.
5. Identify and locate future control burn areas.
6. Fuel break development and planning.
7. Set up administrative study to determine how controlled fires can most effectively improve wildlife habitat.
8. Consider the possibility of wildlife enhancement resulting from fires when classifying land values.

VI. Habitat Management for Wildlife Species

A. Big Game

1. History and Status

Both mule deer and the Coues whitetail deer are common and the range of both species overlap throughout the entire Unit. Together these deer are the most important and most numerous big game animals in the Unit.

Records kept by early pioneers describe deer in large numbers congregating as they moved out of the mountains. Historically the white-tailed deer appeared to be the most abundant of the two species. Mearns in his book "Mammals of the Mexican Boundary" reported that the Sonoran fantail was the most beautiful deer known to him. The flesh was highly sought by both Indians and early day settlers. Market hunting took its toll on deer much the same as the rest of the United States. Up to the early 1930's the Coues whitetail were very plentiful. Local guides, ranchers, and trappers state that a general die off occurred over a large area of New Mexico and Arizona in 1935. Investigation at that time revealed the possibility of blacktongue as the cause. Deer carcasses were numerous over widespread areas.

Mule deer have gradually replaced the whitetail throughout most of the Unit. The estimated population of mule deer is approximately 2,000 and for whitetails, 750. This averages out to between 3-4 deer per section. This, however, is just an estimate and considerable information is needed to determine their status and trend.



Mule deer buck in velvet.

Individual herd units have yet to be defined and located. There is some possibility that the following herds could be distinguished:

- (a) Resident herd along the Blue River and within one mile on either side.
- (b) Maple Peak herd from east of the State line to the San Francisco River and over to the herd in (a) above.
- (c) Big Lue Mountain herd south of the San Francisco River to the State line and Highway 78.
- (d) Black Jack-Mule Creek herd south of Highway 78 and into New Mexico.
- (e) Juan Miller herd west of Blue River to Highway 666 and south to the San Francisco River.
- (f) Greys Peak Herd west of 666 to Eagle Creek.
- (g) Rose Peak, west to Eagle Creek.
- (h) Red Mountain east to the Blue River.
- (i) Migratory Herd that summers on top of the Mogollon Rim and winters in the unit.

These are primarily mule deer herd possibilities and considerable overlap can be expected even if definite herds could be distinguished. Whitetail herds are extremely difficult to locate. Some of the better areas where whitetails have commonly been seen are Bear Mountain, Auger Peak, Sheep Saddle, Rose Peak, Raspberry Peak, Strayhorse, local areas around Sardine and Silver Creeks and along Hickey Canyon north of Sunset Peak. Whitetails have been seen throughout the Unit.

Key areas for deer need to be located and studied. The importance of an overall Big Game range analysis in the Unit is paramount. Some of the areas where concentrations appear to be are:

- (a) VT Ranch, HU Bar
- (b) Highline Trail - Mogollon Rim
- (c) Mud Springs - Black Mountain
- (d) Maple - Bullard Peak
- (e) Four Bar Mesa - Greys Peak

- (f) Cottonwood - Smith Canyons
- (g) Head of Clear Creek
- (h) Heads of Indian-Cienega Creeks - Bullard Peak Area
- (i) Upper Little Blue Creek



Key Mule Deer area on Bullard Peak

Deer numbers appear to be far below the potential for the Unit. Since the early 60's a downward trend in population has occurred. The herds seem to be somewhat static at the present. Fawn crops have shown a general decline with a low of 24% in 1967-68. In 1968-69 the fawn crop for the Blue River (1A) averaged 30%. The fawn crop for Unit 27 was 36% in 1968-69. This is based on a total sample of 206 deer. The reason for the low fawn crops is unanswered and is probably the main area needing immediate research!

Road kills and does collected for research have shown a high incidence of twin fawns and very high single fawn ratios. It is apparent that the fawns are being born but a high number die within the first two months of life. The peak of fawning is usually after

the rains begin which somewhat limits the extent of bloodworm attack. There is some possibility that the effect from the bloodworm is felt prior to fawning time and during the fetal stage. The general decline in total deer numbers is evidently being affected by the poor return of fawns into the breeding herd. Some areas and/or items that may be contributing to the general decline are:

- (a) Roundworm blood parasite and other parasites
- (b) Lack of early green feed (shortage of Vitamin A)
- (c) Diseases
- (d) Sparce cover and lack of water distribution
- (e) Predators
- (f) Poaching
- (g) Loss of habitat by tree encroachment
- (h) Air pollution
- (i) Low nutritional levels of browse
- (j) Lack of food-forbs, variety of browse, etc.
- (k) Periodic draught
- (l) Winter loss

It is entirely possible that one single causative agent is responsible for the decline; however, other factors may be contributing significantly. It may also be that deer in the Southwest have exhibited sporadic cyclic trends and are at the low end of the cycle. (High populations in 1870-80's, 1920-30's, 1950-60's, low populations 1890-1910's, 1930-40's, 1960-?).

From 1959-1964 five hundred either sex permits were issued in addition to the general buck only hunt. Hunter success raised from 22% to 33%. Since 1965 the Unit has had buck only hunting. Hunter success has varied from 15%-50%. In 1968, 1674 hunters harvest 251 mule deer and 39 whitetails for a total of 290 deer and a 17.2% hunter success. It took on an average of 19 hunter days to bag a buck!

Coues whitetail deer generally occupy the most rugged and bushy terrain in the Unit. Mature bucks will weigh from 85-100 pounds. These animals are very secretive and nervous in their habits. Small family sized units seem to be more typical than large herds. Seasonal changes in their territories appear to be minor compared to the mule deer.



Brush country type that whitetails inhabit

Some of the preferred browse plants for the whitetail are mountain mahogany, live oaks, desert ceanothus, sumac, garrya, aspen, pinyon nuts, acorns, vetches and the pea vines. The rut usually occurs in November and December with fawns being born in July and August.

Elk are found in the northern portion of the Unit. These are the Rocky Mountain elk which are not native to the area. The Merriam's elk (now extinct) were native to the southwest and in Arizona, primarily White Mountains. The Merriam's elk were somewhat lighter in color and had a larger skull than the Rocky Mountain elk. The U. S. National Museum has a Merriam's bull elk collected in Arizona in 1886. It is thought that the native elk became extinct around 1900.

Rocky Mountain elk from the Yellowstone herd were introduced into the Campbell Blue area in 1927. This introduction and others in New Mexico have formed the present day elk herd in Unit 27. The estimated population is 500 animals. Due to cover and lack of access, the population estimate is somewhat questionable. Good counts by helicopter crews after an adequate snowfall are needed annually.

Elk from the Hannagan herd normally range above the Mogollon Rim in the summer and migrate into the unit during the winter. Most of the elk use is confined to the area north of an east-west line through Rose Peak and west of the Blue River to the Reservation. The area immediately below the Rim normally has the highest population of elk.



Cow elk in wet meadow

For the past several years there has been an either sex hunt early in the fall. This was for Unit 1A and frequently Unit 27 was included in the early hunt. Mild weather conditions during the early hunt has resulted in a poor harvest for Unit 27. In 1968 the early hunt was dropped in Unit 27. The only elk hunt now is the late one in November.

It is interesting to note that the parasitic nematode, Elaeophora was found in domestic sheep as early as the 1930's. This parasite is also found in elk and deer. The general consensus as to the reason why Merriam's elk became extinct is market hunting and overshooting. It is entirely possible that Elaeophora contributed significantly to the overall reduction in numbers.

Calf elk are born in May and early June. This dry period coincides with the peak activity of the green-headed horse fly. The fly is the intermediate host for Elaeophora. A recent study has indicated that most of the elk calves are infected with the "bloodworm".

It is possible that the resident elk range in the Unit will increase over the present range. Wintering elk could move farther south which would cause additional use on an already overgrazed range. More studies are needed to obtain better management information.

Originally there were two species of bear native to the area. Both were common and several historical records mention their presence. These were the grizzly bear and the black bear. The grizzly bear has been eliminated in the Unit.

Black bears are common in the Unit and have widespread distribution. They are more common in the intermediate and chaparral zones; however, they are occasionally seen in the desert grassland type. Favorite food items include pinyon nuts, acorns, juniper berries, cactus fruits, grass, insects, rodents and carrion. Many ranchers feel that bears are a constant predator on their livestock. Bear hunts with the use of dogs is a common activity. Normally the bear season runs from September to December.



Black Bear are common in the Unit.

Studies in several states have indicated that very few bears actually kill cattle. Since they do feed on carrion it is assumed by many stockmen that they actually did the killing.

The majority of bears harvested in the Unit are usually taken during the deer and elk season. Several well known guides take hunters on both bear and lion hunts. Total annual harvest is approximately 10-15 animals.

Javelina or the collared peccary are common and are found over the entire unit. Preferred areas seem to be in the pinyon-juniper mixed chaparral, oak woodland and semi-desert shrub types. Of these types, the semi-desert shrub seems to contain the highest populations. The farther north you go in the Unit there seems to be fewer and smaller herds. Occasionally sightings have been made on the Mogollon Rim as far north as Middle Mountain near Alpine.



Javelina in typical country.

Generally the meat is not considered tasty; however, this statement can lead into several arguments. Historically the javelinas were quite common and numerous. Indiscriminate killing in the past has been a problem. The classification of the javelina as a game animal has improved this situation considerably. Some ranchers still feel that the "little pigs" are nothing more than a nuisance and continue to shoot them for target practice.

Several winters with deep snowfall have periodically and seriously reduced the javelina herds. The winter of 1967-68 was very hard on not only the javelina but most of the other animals in the Unit. The remains of one herd of eight was found on Thomas Creek under Red Mountain following the winter.

Some of the major food items for javelina include acorns, pinyon nuts, juniper berries, mesquite beans, opuntia, mescal, wild onion and ocotillo.

At the present time Arizona has a javelina archery season during the month of January and a rifle season for one week in February. Harvest for the Unit has been small due to access and has varied from 0 to 10 animals.

The average boar will weigh approximately 30 pounds and the females a pound or two smaller. Natural predators include coyotes and lions. A study in Arizona indicated that young javelina are highly susceptible to infection by Balantidium coli. This infection results in a high juvenile mortality.

Good javelina areas are located on Eagle Creek, Blue River, Garage Mesa, Lone Tree Mesa, Pat Mesa, Clear Creek, VT and Fritz Ranch. The largest reported herd in the unit contained 42 animals and was between Bullard Peak and the Blue River.



Good Javelina and quail country on the Pigeon Allotment.

2. Management Objectives

The management objective for all big game in the Unit is to manage the habitat to its fullest potential. This in turn would allow the maximum number of animals that will be consistent with the other resources. Close multiple coordination is a vital need and will increase with the population pressures.

3. Special modifications in game management jobs needed for coordination with other uses are:

(a) One of the top priority jobs is to create an awareness and consciousness for wildlife and the necessary multiple use coordination measures. Efforts are being made to improve this through an information and education program. Most of the personnel on the Apache are interested in wildlife; however, wildlife needs are often overlooked or unrecognized. These needs will be emphasized in multiple use reports, on-the-ground investigations, training sessions and general I&E work.

(b) All Forest jobs create an impact on wildlife. The main purpose of coordination is to accomplish and/or modify the project so that wildlife values are enhanced.

4. Surveys and Studies

Several studies have been conducted in the Unit or adjoining areas that have carryover value to the Unit. Two of these were the Elk Blindness Study with Colorado State University and the Javelina Parasite Study.

Other studies have included: The Black River deer food preference study and a Chaparral Reconnaissance (Swank 1954).

Present studies in the Unit are on Four Bar Mesa, Grays Peak and East Eagle Creek. A study in the Eagle burn was recently dropped since it was felt that little beneficial information was being gathered. The studies measure deer use and consist of pellet groups, browse form and age class and the Montana Survey utilization. All of the information is collected within .01 acre plots.

It is felt that the East Eagle three way closure study is improperly located. This will be evaluated and a decision will be made to determine if any management information is being gained. If not, the study will be terminated. There has been little game use in the study area.

At the present time there are no transects that measure elk use. Information is needed on both the resident herd and the migratory herd from the Rim. Some possible study sites occur between the Highline Trail and the Mogollon Rim.

The Arizona Game and Fish Department does not read any permanently located transects at the present time. Depending on use patterns, areas are selected for running random transects. Sample sites may vary from year to year.

The Department conducts annual surveys on deer from December to February. If possible, the animals are classified as to bucks, does, and fawns. Whitetail information is separated from mule deer information. Surveys are usually conducted on horseback and/or by vehicle. Occasionally airplanes and helicopters are used for additional information. Information such as abundance of browse, type and use is recorded when ground surveys are conducted. Other animals such as javelina, predators and elk are recorded.

Probably the number one wildlife priority concerning habitat is the need for a good Game Range Analysis. Several western states have formulated and modified various techniques for analyzing Big Game ranges. These techniques are usually adopted by representatives from various agencies such as the State Fish and Game Departments, Bureau of Land Management, U. S. Forest Service, etc. The groups are referred to as Interagency Browse Councils.

Hunt Recommendations

The hunting season recommendations are formulated by both the Game and Fish Department and the State Game Commission. The Forest Service makes its recommendations to the State based on habitat conditions as they relate to the Unit. Interagency meetings have been useful and informative in the past. Annual meetings should be included in the action section and an attempt to encourage more coordinating measures emphasized.

5. Research and Administrative Studies

Additional wildlife information is needed in several areas to increase our management techniques. One very important study concerns the high mortality of fawns. Attempts are being made to start a study dealing with the problem. A study is underway in New Mexico where they are experiencing the same problem. Captive deer have had a much higher fawn survival than the wild ones. The captive deer were caught while pregnant and were from the problem areas. Cooperation and an exchange of information from all concerned agencies is essential.

Very little information is known about individual mule deer herds. The same is generally true for whitetails. A trapping, banding and recording project would help locate and describe these units.

Elk trapping and banding would help locate herds and delineate migration routes. The extent of elk movement in the Unit is not presently known.

A close review and analysis of the 1968-69 predator control program is needed. If this year's fawn crop is any indication of the effect then the program should be discontinued. Predators naturally will remove animals out of a herd; however, the effect is normally not as great as many people advocate.

In addition to use and habitat studies it would be very valuable to begin annual sex and age ratio helicopter counts. The large size of the Unit and poor access limit the effectiveness of ground counts.

A census of the javelina is needed. This could be coordinated with range inspections.

Periodic observations of pronghorns have been made. It is estimated that between 10-15 animals constitute the population in the Unit. A reconnaissance of the area is needed to determine the animals status, range, productivity and numbers. The pronghorns appear to be concentrated in the Alma Mesa area. Recent pinyon-juniper control projects in the area should increase their habitat requirements.

6. Direct Habitat Improvement

The potential for developing good wildlife habitat in the Unit is very high. Water developments for range cattle have been important for wildlife. Generally speaking, however, water is not considered a major limiting factor in the Unit. Wildlife numbers can be increased somewhat as well as their distribution by developing additional water. Basically, wildlife populations can be modified by developing water. Some of the areas that would rate high for developing trick tanks would be Red Mountain, Rattlesnake Canyon, Maple Peak, Engineer Springs and Bear Canyon.

Natural meadows or cienegas are almost non-existent. Those that are present are small and heavily overused. Some areas that need additional reconnaissance for possible protective fencing include Raspberry and Crabtree Parks, Salthouse Canyon meadows, the head of Turkey Creek, Squirrel Canyon and Bear Valley. These areas could be seeded with desirable grasses and forbs to increase their potentials.

The creation of openings to increase "ecotone" or edge effect has a great potential in the Unit. Areas containing pinyon-juniper, a mixed conifer and chaparral could have small openings cut in them. This allows for a change in plant succession beginning with forbs which is desirable for most wildlife species.

Another area needing research is the use of controlled burns. The potential for improving the wildlife by burning is tremendous. Plans should include the possibility of burning on an annual orderly basis. This will create and stimulate several "stages" of vegetative development from annual forbs to chaparral.



Dense pinyon-juniper and chaparral offer excellent potential for controlled burning.

Mechanical control treatments for wildlife and range projects have a good potential. The activities will be somewhat limited due to the heavy rock cover. Treatment costs in relation to controlled burning are somewhat higher. The emphasis on air pollution and better clean-up of control projects may limit projects even more.

7. Special Management Programs and Problems

(a) Historically, desert Bighorn sheep inhabited an area along the San Francisco River. The area overlaps the State line into New Mexico. A beaver trapper, James O. Pattie, and his party wrote that there were "multitudes" of mountain sheep among the rocks and cliffs of the San Francisco River in January of 1825. No reliable reports of Bighorns in the area have been made for several years.



-Typical Bighorn habitat

The New Mexico Department of Game and Fish introduced a small herd of Rocky Mountain Bighorns in the Glenwood area on the San Francisco. These animals seem to be moving on both sides of the river and may eventually spread into Arizona.

The Arizona portion of the San Francisco River contains some of the roughest and wildest terrain in the State. The possibility of reintroducing Bighorns into the area should be given consideration.

At least two fairly reliable reports have been made of Barbary sheep in the Unit. Both of these reports were in the "Sand-rock Allotment" country. Arizona hasn't planted any Barbary sheep and the closest reported release in New Mexico was several hundred miles from the area (near Hondo, New Mexico).

(b) The classification of the lion as a game animal certainly deserves consideration. Arizona and particularly Unit 27, has one of the best lion populations in the country. Lion hunting attracts hunters from all over the United States. Definite management objectives to harvest the lion as a renewable resource should be implemented.



Lion populations at the present are good in the Unit.

(c) Both deer and elk check stations would be helpful in the Unit. Additional information such as sex and age structure, food habits, parasites, etc., could be collected at these stations.

B. Upland Game

1. History and Status

Upland game in the Unit consists of turkey, blue grouse, Mearns' quail, scaled quail, Gambel's quail, band-tailed pigeon and doves.

Turkey are located in most of the Unit except for some of the southern portions. In addition to scattered resident flocks, large numbers of turkey migrate from the Rim country into the Unit during the winter. Generally turkeys are associated with the pine and/or mixed pinyon-pine vegetative types.



Mature pine with good herbaceous understory and scattered oak is excellent turkey habitat.

Berries of all types, especially juniper, pinyon and pine nuts, acorns, insects and grass are important turkey food items. Tall grasses are very beneficial during hard winters.

Poult crops seem to vary with the severity of spring storms. Spring weather with cold rains, hail, freezing temperatures, and wind are detrimental to good poult crops. Dense vegetation for escape cover is needed for young poults. The importance of turkey roost trees has been recognized for many years. Generally they are large ponderosa pine

trees with big open branches. The trees are more commonly found on south facing slopes; however, they have been identified on all slopes. Roost trees are usually in a group of three or four trees but may be only a single tree.



Turkey roost tree

Turkey and quail distribution seems to be modified more by water than most other animals. Turkeys normally come to water twice each day, although once is sufficient. In the winter turkeys will eat snow until free water is available.

The turkey population probably varies as much as 500-1000 birds.



Banding turkeys can provide valuable information on movement and distribution

Blue grouse are found in only the northern portion of the Unit. Sightings have been made as far south as the Honeymoon Ranch. The majority of the birds are in the mixed-conifer region below the Rim. Grouse numbers in the Unit are low and it is doubtful that their range can be extended farther south. Census is difficult even in accessible country. Food habits are quite variable. Vetches, dandelion, mistletoe, buckwheat, berries, insects and conifer needles comprise most of their diet. Populations are quite variable as with most of the grouse species.

Three varieties of quail are found in good numbers within the Unit. They are the Mearns, scaled and Gambel quail. Scaled quail are most common in the semi-desert grassland shrub complex. They are also found in some of the lower woodland country. Scaled quail build their nests on the ground. The nests are usually concealed in grass, yucca or brush piles. Coveys usually maintain a territory of less than 40 acres. Insects, weed seeds, leafy green feed and grass seeds are important food items. Scaled quail are ground roosters and form small circles with their heads facing out.



Scaled quail are more common in the semi-desert grassland.

Gambel quail are found in most of the Unit except for the higher elevations. Flocks of 50-60 are commonly seen on Pat Mesa, Sunset Peak, Pigeon Basin, Eagle Creek, Tule, and the mesas on both sides of the Blue River. Gambel quail are somewhat smaller than the scaled quail. Unlike scaled quail, the Gambel quail roost in shrubs and trees. Gambel quail are more restrictive to their territory than scaled and seem to prefer bottom lands and upland habitat with shrub and/or thorny vegetation.



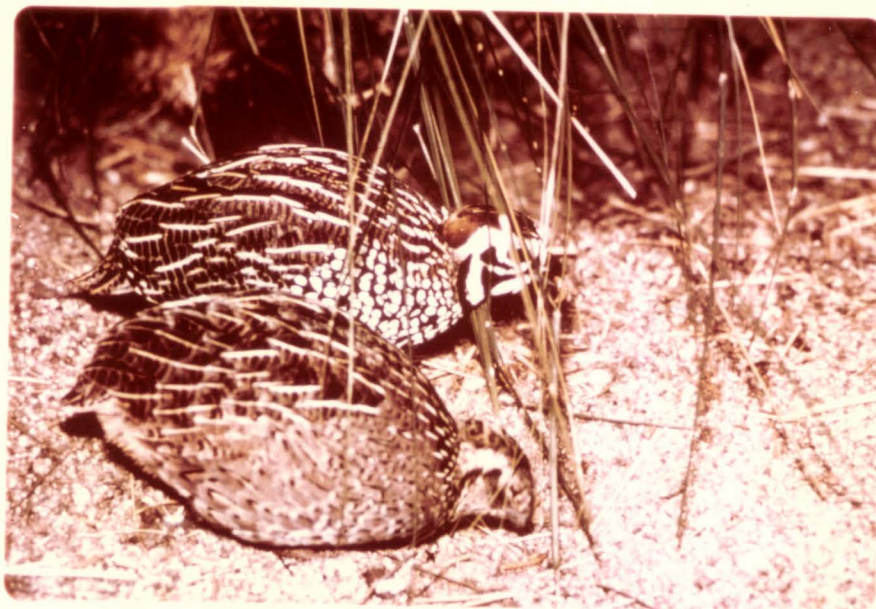
Gambel quail use brush piles for cover.

The Mearns quail is a subspecies of the Harlequin quail commonly found in Mexico. The Mearns quail are often referred to as "fool quail" due to their secretive habits. They hold very tight and are a pleasure to hunt with dogs.

The nest of the Mearns is made of grass and resembles a dome with one small entrance. One of the primary food items for the birds is yellow nutgrass, sedge, Cyperus esculentus. The quail dig up the small tubers of this plant with their feet.

Mearns quail are found in almost every vegetative type on the Apache National Forest. They have been found from Burro Mountain and Baldy

Mountain over 10,000 feet to the lowest grassland. In the Unit they have been observed around Brushy Mountain, Sunset Peak, Wildbunch Canyon and along Eagle Creek. The need for an adequate grass cover is an important habitat requirement for the Mearns quail.



Mearns quail are found from semi-desert to mixed conifer.

All quail populations seem to be very closely related to the average annual rainfall. Drought conditions normally limit a good quail hatch.



Good quail habitat in the Sandrock country.

Band-tailed pigeons are found in the northern half of the Unit and around Mule Creek. This overlaps somewhat with the mixed oak to mixed conifer vegetative type. Until recently, band-tailed pigeon hunting was very restrictive or non-existent. Recent and continuing studies have indicated that there is an adequate huntable population.

Reproduction is usually one young per breeding pair per year. This small reproductive potential will necessitate careful management techniques. In 1969 there were 22 pigeon hunters that harvested 89 birds. This averaged four birds per person and was the fourth highest success ratio in the State.

Some of the preferred food items include berries, insects, pinyon and pine mast and acorns.

Mourning doves are found in fair numbers over most of the Unit. Populations are higher near agricultural developments. Nesting usually consists of two eggs and as many as five or six broods per year are hatched. Nesting success is very sporadic. Doves are a very important game bird in Arizona and rate high with most hunters. Due to the larger concentrations of birds along the developed agricultural lands outside of the Unit they are not actively hunted in the Unit.

C. Waterfowl

1. History and Status

Waterfowl numbers in the Unit are restricted due to the lack of water. A few ducks and occasional geese are seen along the Blue, Eagle and San Francisco Rivers. Some use on scattered stock ponds has been observed. Mallards are the most common duck in the Unit followed by teal and pintails. Mergansers commonly nest and rear young along the Blue River. Due to the overall lack of suitable wetland habitat waterfowl attract only minor attention.



Mallards are the most common duck in the Unit.

D. Furbearers, Predators, Small Game and Non-Game Animals

1. History and Status

Good lion populations are found in the Unit. The increased use of guides with dogs has attracted hunters from all over the United States. Rates vary from guide to guide with a 10 day hunt-\$100/day rate being the going price. Lions are occasionally taken by deer and elk hunters. Several lions have been taken while responding to predator calls.

One item of special interest concerns the relationship of lion populations and deer. One of the most respected lion hunters in the country (ex-Government lion trapper) says that during the 1930's and 40's he would ride as many as 90 days without seeing a cat track. Now he can cut fresh signs in any direction from his ranch in one day's ride. Several lions have been seen around his ranch recently. This may be the "peak" in the predator cycle following the high deer populations of the 1950-60's. If so, it has lasted for several years.

Most states have classified the lion as a game animal and it rates high as a trophy animal. Considerable interest and controversy is being generated over the current legal status of the lion which classifies it as a predator. The National Boone and Crockett organization refuses to recognize lions taken in Arizona since it is classified as a predator and bounties are paid. Pressure by the stockmen and their organizations to keep the lion classified as a predator will continue to generate interest for many years.

Jaguars are rare in the Unit at the present time. Occasionally one or a pair will be seen in the area. These animals are probably on transient hunting trips. In 1968 a 105 pound female was shot as she was responding to a predator call south of Big Lake. That same year a 150 pound male was killed by the Government trapper on the Fort Apache Reservation.

Coati or Coatimundi are also rare in the Unit. Several recent observations by reliable sources indicate that they may be inhabiting the area. Normally, the little omnivorous mammals are found in little bands south of the Unit. Food items consist of fruits, nuts, eggs, tarantulas, scorpions, lizards and insects. Sightings of these animals and jaguars should be checked and recorded.

The historic range of the rare black-footed ferret and the river otter includes all of the Unit. Very little information about either of these animals is known and all reports should be documented.



Black-footed ferret
(Sport Fisheries & Wildlife Photo)

Three species of tree squirrels are found in the Unit. These are the Abert, Arizona grey and the red squirrel. The Abert squirrel is associated with the pine and mixed conifer types. The Arizona gray is found along the creek and river bottoms. The Arizona gray territory seems to be closely associated with the Arizona black walnut. The Arizona gray is approximately the same size as the Abert squirrel.



Arizona Gray Squirrel

Abert squirrel eat a large variety of foods which include mushrooms, other fungi, nuts, acorns and the cambium bark of pine tree twigs. The cuttings of pine twigs indicate the presence of Abert squirrel. Color variations are frequent in the Unit. These are from dark to light gray, including both bodies and tails. The Abert squirrel is hunted in Arizona and they have many dedicated followers. Mixed bags of Aberts, Arizona grays and red squirrels were observed during the past hunting season.



Abert squirrel killed by automobile

The red squirrel inhabits the mixed conifer zone and is most closely associated with spruce and fir trees. Cones of spruce, white and Douglas fir in addition to fungi are primary food items. The season for tree squirrels is from October 2 to November 30 with a bag limit of five per day.

Both the desert and mountain cottontail rabbits are found in the Unit. At the present time very few hunters are attracted to the Unit to pursue rabbits. Rabbit season is open year-round and the bag and possession limit is ten per day.

Coyotes are common and found in all areas of the Unit. The increase in the use of predator calling has grown tremendously. At the present time there are organized "calling" groups. The Arizona Varmint Callers were the originators of SAVE. This is an organization representing Sportsmen Against Vandalism Everywhere.

Considerable concern over predators especially coyotes and lions has increased. This is typical wherever low deer populations occur. Their effect on the total populations is not considered to be the limiting factor for the present low deer populations.

Several species of rare and endangered animals are thought to occur in the Unit. These are listed in the Appendix and any information concerning them should be documented. The increased awareness in the Rare and Endangered Species situation is beneficial and should help gain some needed information.

2. Management Objectives, Surveys and Direct Habitat Improvement

Due to the general lack of small game and bird hunting interest in the Unit most of the increase in game populations are taken by natural mortality. An increase in small game hunting can be expected following the completion of Highway 666. A good I&E program is needed to encourage hunters to use the area.

The need for all Forest personnel in the Unit to collect and record information is essential. Observations of animals should include:

- (a) Number
- (b) Sex
- (c) Age classes
- (d) Condition
- (e) Habitat or vegetative type
- (f) Date
- (g) Location
- (h) Reactions

Copies of this information should be summarized and sent to the State Game Manager and Forest Biologist.

It is doubtful that any studies will be initiated in the Unit in the near future. Areas containing higher populations of animals like turkey, quail, grouse, rabbits and squirrels and easier access are available in the State. The one main topic concerning animals in this Unit and deserving intensive research is the lion, its habits, status and management potentials.

It seems that the Unit is ideally suited for special hunts such as the spring gobbler hunt. Lack of access would limit success, yet create additional recreational opportunities. Another possibility would be a spring bear hunt. Most ranchers feel that bears are a definite problem, especially in the spring calving season. An additional hunt for a short time in the spring would provide for additional recreational opportunities and would probably distribute the animals over a larger area.

The establishment of small brush piles is important for many song birds, rabbits and quail. The coordination with range improvements, road projects, timber projects, etc., should include leaving scattered brush piles.



Good habitat improvement involves leaving occasional brush piles.

Water tank developments should have escape ramps installed in them. These are beneficial to many of the small animals.

The fencing of springs and other water developments should be considered on an individual basis. The fenced areas allow vigorous succulent plant growth. The piping of water from a spring into a tank outside the fenced area protects the spring and provides good clean water outside.

The importance of snags in Forest management is often overlooked. Several birds, woodpeckers and squirrels depend heavily on snags for food storage, observation areas, dens and nests. Coordination measures will be emphasized during the Forest log grading school. Roost trees and snags being used will be identified and discussed at the school.



Snag showing considerable woodpecker activity and song
bird nesting cavities

Roost trees in the Unit are probably numerous in the areas not yet harvested for timber. The need to preserve these trees will be emphasized during timber marking and cruising.

The need and potential value for more rest rotation grazing in the Unit is very high. Pastures being rested would provide for more grass cover. This would be beneficial to quail, rabbits, turkey, elk and other forms of wildlife.

The need to fence certain areas for turkey food plots should be determined by an administrative study in Bear Valley. This would be a good project if funds become available.

Construction of additional wildlife trick tanks would help increase wildlife distribution.



Wildlife trick tank, 630 gallon storage tank and trough drinker

Considerations should be given to protect the Arizona black walnut in the Unit. This is the main food source for the Arizona gray squirrel and to reduce the food supply would surely reduce their numbers.



walnuts gathered by gray squirrels. Note partially opened nuts

The seeding of desirable forbs and grasses in cooperation with all projects that will disturb the soil is a high priority. The resulting food value and cover is needed.

Several bald eagles inhabit the area, especially in the winter. An all out effort to locate any nesting sites should be made. In the event that nests are located, they should be documented and observed as often as possible. This is an area where a special management unit should be established recommending their protection and other measures.



Bald Eagles normally nest in snags along water courses.

A study to determine the effects of smelter pollution on wildlife habitat is needed.



Smelter pollution from Clifton area.

E. Fish

1. History, Status and Distribution

There are approximately 30 miles of cold water fishery in Unit 27. All of this is located in the Eagle Creek drainage. Chitty Creek which flows into Eagle Creek has about three miles of trout water.

Historically, the Apache Native trout was found in the headwaters of Eagle and Chitty Creeks. The stocking of rainbows has resulted in a crossed strain of these two trout.



Apache Native trout

Crossed rainbow and native trout



Eagle Creek appears to be a very marginal trout producing area. Temperatures gradually rise as you go further down the creek and prior to the rainy season. Temperatures have exceeded 75° during June, July and August. There is a large population of boney tails and other rough fish in the creek which add to the problem.

At the present time, hatchery catchables are stocked twice yearly in Eagle Creek. This is normally in April and again in May. Many people in and around the Clifton area "follow" the stocking truck.



Rainbow weighing 1 pound and 12" long indicating excellent growth.

Fingerling browns and one load of larger browns have been stocked in the creek to establish a more permanent fishery. Consideration to stocking small mouth bass, channel cats and other game fish should be considered.

Trout are planted as catchables in the Blue River above the Unit boundary. Occasionally they are caught farther downstream. Most of the Blue River and San Francisco Rivers provide fair to good catfishing.

The potential fishery for all of the three main watersheds would appear to be considerably higher than its current status.

2. Surveys and Studies, Research, Habitat Improvement

Eagle Creek and the Blue River are monitored in April, May, July and September. Sample copies are included in the Appendix.



Blue River contains catfish. The Blue and San Francisco may be capable of supporting small mouth bass.

Sample sites should be included for the lower San Francisco. This would be helpful in determining fish habitat and fishery needs.

One of the top priority projects concerning fish in the Unit is an adequate stream inventory. A Forest school is scheduled this May to train personnel in the procedures.

Research on the Black River within the Fort Apache Reservation has indicated that small mouth bass have a good potential for waters of that type. Both the lower Blue and San Francisco need preliminary work to determine the feasibility of stocking bass in them.

Seventeen trash catcher structures have been constructed in Eagle Creek. Most of these are functioning well. Chitty Creek has areas that could be improved by in channel structures. A stream inventory of this creek is needed to determine the number and location.



Trash catcher dam on Eagle Creek

The feasibility of treating Chitty Creek and stocking of native trout should be considered. This would eliminate the rainbow-native cross and other rough fish and provide a good fishery for the Apache trout.

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APPENDIX

TABLE I

RARE AND ENDANGERED FISH AND WILDLIFE SPECIES - UNIT 27

BIRDS

American Peregrine Falcon - Endangered
Spotted Owl - Rare
Black-eared Bushtit - Rare
Gray Hawk - Rare
Southern Bald Eagle - Rare
Flammulated Owl - Rare
Olive Warbler - Rare
Buff-breasted Flycatcher - Rare in U. S. only
Sulphur-bellied Flycatcher - Rare in U. S. only
Violet-crowned Hummingbird - Rare in U. S. only
Aplomado Falcon - Rare in U. S. only

MAMMALS

Black-footed Ferrett - Endangered
Black-tailed Prairie Dog - Rare
Spotted Bat - Rare
Dwarf Shrew - Rare
Coatimundi - Peripheral
Jaguar - Peripheral
Grizzly Bear - Extinct (In Unit)
Merriam's Elk - Extinct

APPENDIX

TABLE II

HARVEST DATA - UNIT 27

DEER

Year	Mule Deer		Whitetail		Total	% Success	D/B	FC
	Buck	Antlerless	Buck	Antlerless				
1957							1.8*	36*
1958	360	70			430	36	1.0*	32*
1959	242	77	69	59	447	28	2.2*	56*
1960	333	39	54	54	480	33	1.2	40
1961	306	37	46	37	426	29	2.9	85
1962	176	69	79	78	383	27	2.4	40
1963	295	137	21	53	506	25	1.6	46
1964	251	43	81	5	380	22	1.0	39
1965	248		50		298	20	1.6	27
1966	269		34		303	20	4.4	35
1967	247		21		268	15	4.1	30
1968	251		39		290	17		
1969								

* Units 1 and 27 combined for D/B & FC.

TABLE II

HARVEST DATA - UNIT 27

ELK

Year	Permits	Bulls	Cows	Calves	Total Kill	% Success	Units
(L) 1957	250B	32			32	16	1A, 1B, 27
(E) 1958	200B	56			56	30	1A, 27
(E) 1959	200B	57			57	30	1A, 27
(E) 1960	250B	55			68	22	1A, 27
	50A		13			26	1A, 27
(E) 1961	250A	42	48		90	37	1A, 27
(E) 1962	400	39	34		73	19	1A, 27
(L) 1963	150A	28	29		57	40	27
(L) 1964	150A	19	23		42	31	27
(L) 1965	150A	10	26		36	24	27
(L) 1966	150A	23	24		47	34	27
(L) 1967	152A	2	28		33	21	27
	100B	3				3	27
(L) 1968	150A						27
(E) 1963	600	55	81		136	24	1A, 27
(E) 1965	600	51	53		104	18	1A, 27
(E) 1966	150A	23	19	5	47	34	27
(E) 1967	152B	3			3	3	27
	100A	2	23	5	30	21	
(E) 1968	150A	10	5	1	16	11	27

(L) = Late Hunt

(E) = Early Hunt

TABLE II - HARVEST DATA UNIT 27 (cont'd)

<u>TURKEY</u>		<u>JAVELINA</u>	
<u>Year</u>	<u>Kill</u>	<u>Year</u>	<u>Kill</u>
1962	23	1959	4
1963	23	1961	15
1964	22	1962	15
1965	30	1963	8
1966	19	1964-66	0
1967	21	1967	8
1968	22	1968	9
1969		1969	0

TABLE III

SUGGESTED WILDLIFE FORAGE PLANTS
FOR INCLUSION IN REVEGETATION PROJECTS

<u>GRASSES</u>	<u>FORBS</u>	<u>BROWSE</u>
Russian Wildrye - PP, PJ	Chickpea Milkvetch - PP, PJ	Silk Tassell - PJ, SD
Tall Oatgrass - PP, PJ	Bramble Vetch - PP, PJ	Russian Olive - PP, PJ
Weeping Lovegrass - PJ, SD	Sickle Alfalfa - PP, PJ	Twinberry - PJ, SD
Crested Wheatgrass - PP, PJ	Rambler Alfalfa - PP, PJ	Fendler Bush - PJ, SD
Pubescent Wheatgrass - PP, PJ	Nomad Alfalfa - PP, PJ	Desert Ceanothus - PJ, SD
Bulbous Bluegrass - PP, PJ	Utah Sweetvetch - PP, PJ	Buckthorn - PJ, SD
Mutton grass - PP, PJ	Sweet Clover - PP, PJ	Saltbush - PJ,SD
Indian Ricegrass - PJ, SD	Patch Buckwheat - PJ, SD	Desert Bitterbrush - PJ
Pinyon Ricegrass - PJ, SD	Small Burnet - PP, PJ	Serviceberry - PP, PJ
Sideoats Grama - PJ, SD	Palmer's Penstemon - PP, PJ	Dwarf Rabbitbrush - PP, PJ
Sand Dropseed - PJ, SD	Cicer Milkvetch - PP, PJ	Mountain Mahogany - PJ, SD
Vine Mesquite - PJ, SD		Caragana - PJ, SD
Spike Muhly - PP, PJ		Range Ratany- SD
Blue Panic - PJ, SD		

LEGEND:

PP = Ponderosa Pine

PJ = Pinyon-Juniper

SD = Semi-desert

Hawks, Owls, Eagles, found on the Apache National Forest, Arizona.

Turkey Vulture	
American goshawk	A
Sharp Shinned Hawk	A
Cooper's Hawk	A
Red-tailed Hawk	B
Swainsons	B
American Rough Leg	B
Ferruginous Rough Leg	B
Golden Eagle	
Bald Eagle	
Marsh Hawk	H
American Osprey	O
Prairie Falcon	F
American Peregrine	F
Pigeon Hawk	F
Sparrow Hawk	F
Accipiter - Bird Hawks	-A
Buteonine - Buzzard Hawks	-B
Harriers	-H
Fish Hawks - Ospreys	-O
Falcons	-F

Mammals that are listed as probably occurring on the Apache National Forest

VOLES, MICE, RATS & SHREWS

R-1 Mexican Vole	<u>Microtus mexicanus</u>
R-2 Mountain Vole	<u>Microtus montanus</u>
R-3 Longtail Vole	<u>Microtus longicaudus</u>
R-4 Meadow Vole	<u>Microtus pennsylvanicus</u>
R-5 Northern Grasshopper Mouse	<u>Onychomys leucogaster</u>
R-6 Southern Grasshopper Mouse	<u>Onychomys torridus</u>
R-7 Pinon Mouse	<u>Peromyscus truei</u>
R-8 Rock Mouse	<u>Peromyscus difficilis</u>
R-9 Brush Mouse	<u>Peromyscus boylei</u>
R-10 White-footed Mouse	<u>Peromyscus leucopus</u>
R-11 Deer Mouse	<u>Peromyscus maniculatus</u>
R-12 Canyon Mouse	<u>Peromyscus crinitus</u>
R-13 Cactus Mouse	<u>Peromyscus eremicus</u>
R-14 Western Harvest Mouse	<u>Reithrodonomys megalotis</u>
R-15 Plains Harvest Mouse	<u>Reithrodonomys montanus</u>
R-16 Merriam Kangaroo Rat	<u>Dipodomys merriami</u>
R-17 Ord Kangaroo Rat	<u>Dipodomys ordi</u>
R-18 Bannertail Kangaroo Rat	<u>Dipodomys spectabilis</u>
R-19 Hispid Pocket Mouse	<u>Perognathus hispidus</u>
R-20 Silky Pocket Mouse	<u>Perognathus flavus</u>
R-21 Apache Pocket Mouse	<u>Perognathus apache</u>
R-22 Valley Pocket Gopher	<u>Thomomys bottae</u>
R-23 Muskrat	<u>Ondatra zibethica</u>
R-24 Western Jumping Mouse	<u>Zapus princeps</u>
R-25 Porcupine	<u>Erethizon dorsatum</u>
R-26 Boreal Redback Vole	<u>Clethrionomys gapperi</u>
R-27 Bushytail Woodrat	<u>Neotoma cinerea</u>
R-28 Whitethroat Woodrat	<u>Neotoma albigala</u>
R-29 Southern Plains Woodrat	<u>Neotoma micropus</u>
R-30 Stevens Woodrat	<u>Neotoma stephensi</u>
R-31 Mexican Woodrat	<u>Neotoma mexicana</u>
R-32 Gray Shrew	<u>Notiosorex crawfordi</u>
R-33 Northern Water Shrew	<u>Sorex palustris</u>
R-35 Vagrant Shrew	<u>Sorex vagrans</u>
R-36 Dwarf Shrew	<u>Sorex manus</u>
R-37 Merriam Shrew	<u>Sorex merriami</u>
R-38 Beaver	<u>Castor canadensis</u>

BATS, PIPISTRELS, AND MYOTIS

B-1	Pallid Bat	<u>Antrozous pallidus</u>
B-2	Big Freetail Bat	<u>Tadarida molossa</u>
B-3	Mexican Freetail Bat	<u>Tadarida brasiliensis</u>
B-4	Western Big-eared Bat	<u>Plecotus townsendi</u>
B-5	Spotted Bat	<u>Euderma maculata</u>
B-6	Hoary Bat	<u>Lasiurus cinereus</u>
B-7	Red Bat	<u>Lasiurus borealis</u>
B-8	Big Brown Bat	<u>Eptesicus fuscus</u>
B-9	Western Pipistrel	<u>Pipistrellus hesperus</u>
B-10	Small-footed Myotis	<u>Myotis subulatus</u>
B-11	Silver-haired Bat	<u>Lasionycteris noctivagans</u>
B-12	Yuma myotis	<u>Myotis yumanensis</u>
B-13	Long-legged Myotis	<u>Myotis volans</u>
B-14	California Myotis	<u>Myotis californicus</u>
B-15	Long-eared Myotis	<u>Myotis evotis</u>
B-16	Fringed Myotis	<u>Myotis thysanodes</u>
B-17	Cave Myotis	<u>Myotis velifer</u>
B-18	Arizona Myotis	<u>Myotis occultus</u>
B-19	Keen Myotis	<u>Myotis kuni</u>

TREE SQUIRRELS, CHIPMUNKS, GROUND SQUIRRELS & PRAIRIE DOGS

S-1	Red Squirrel	<u>Tamiasciurus hudsonicus</u>
S-2	Arizona Gray Squirrel	<u>Sciurus arizonensis</u>
S-3	Tassel-eared Squirrel	<u>Sciurus aberti</u>
S-4	Cliff Chipmunk	<u>Eutamias dorsalis</u>
S-5	Grayneck Chipmunk	<u>Eutamias cinereicollis</u>
S-6	Least Chipmunk	<u>Eutamias minimus</u>
S-7	Spotted Ground Squirrel	<u>Citellus spilosoma</u>
S-8	Whitetail Antelope Squirrel	<u>Ammospermophilus leucurus</u>
S-9	Yuma Antelope Squirrel	<u>Ammospermophilus harrisi</u>
S-10	Golden-Mantled Squirrel	<u>Citellus lateralis</u>
S-11	Thirteen-lined Ground Squirrel	<u>Citellus lateralis</u>
S-12	Rock Squirrel	<u>Citellus variegatus</u>
S-13	Blacktail Prairie Dog	<u>Cynomys ludovicianus</u>
S-14	Whitetail Prairie Dog	<u>Cynomys gunnisoni</u>

HARES & RABBITS

H-1	Blacktail Jackrabbit	<u>Lepus californicus</u>
H-2	Mountain Cottontail	<u>Sylvilagus ruttalli</u>
H-3	Eastern cottontail	<u>Sylvilagus floridanus</u>
H-4	Desert Cottontail	<u>Sylvilagus auduboni</u>

PREDATORS

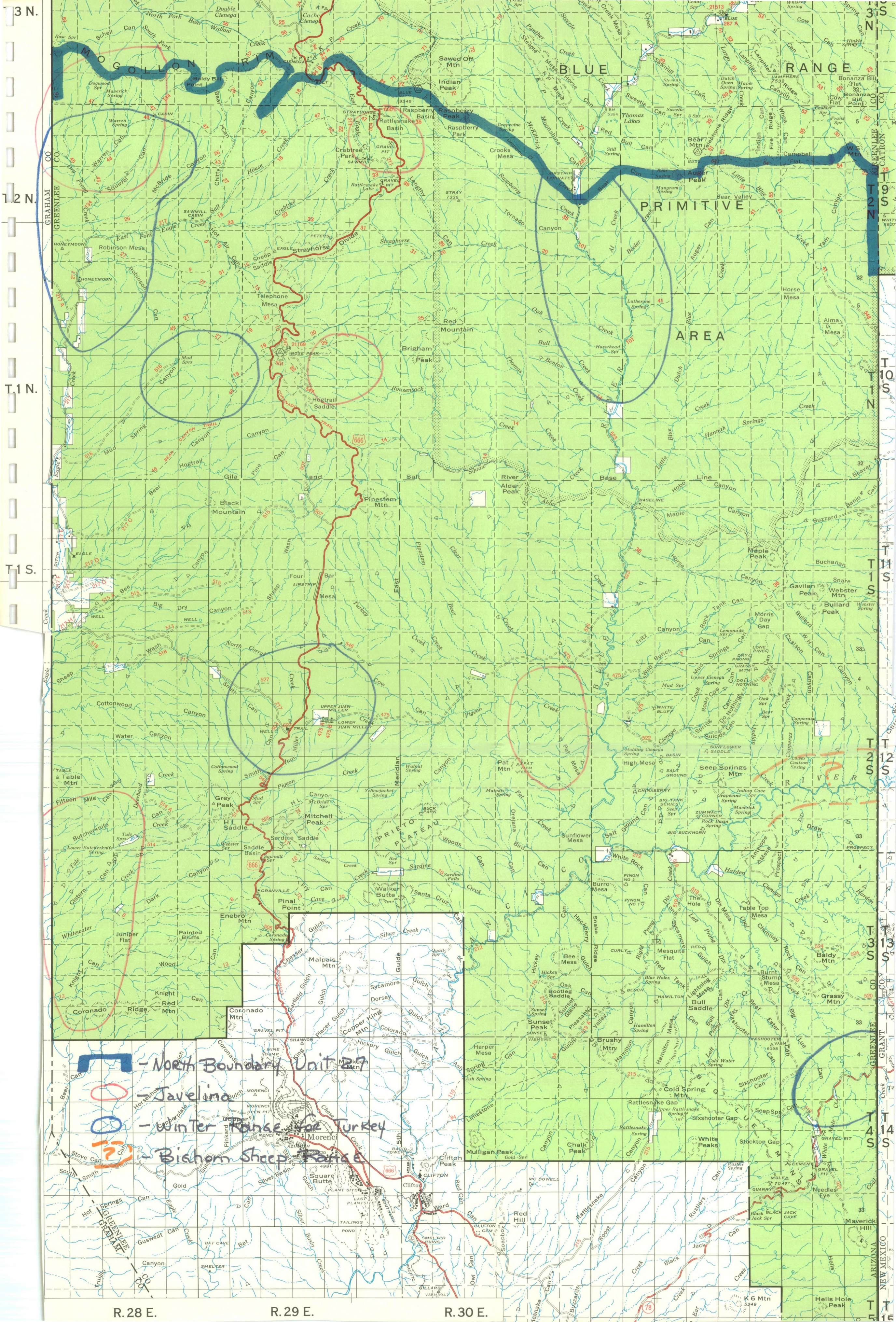
P-1 Bobcat
P-2 Mountain Lion
P-3 Gray Fox
P-4 Kit Fox
P-5 Coyote
P-6 Hognose Skunk
P-7 Spotted Skunk
P-8 Striped Skunk
P-9 Badger
P-10 Black-footed Ferret
P-11 River Otter
P-12 Longtail Weasel
P-13 Coati
P-14 Ringtail
P-15 Raccoon
P-16 Black Bear

Lynx rufus
Felis concolor
Urocyon cinereoargenteus
Vulpes macrotis
Canis latrans
Conepatus leuconotus
Spilogali putorius
Mephitis mephitis
Taxidea taxus
Mustela nigripes
Lutra canadensis
Mustela frenata
Nasua narica
Bassariscus astutus
Procyon lotor
Ursus americanus

GAME ANIMALS

B-1 Peccary
B-2 Whitetail Deer
B-3 Mule Deer
B-4 Pronghorn
B-5 Elk

Pecari angulatus
Odocoileus virginianus
Odocoileus hemionus
Antilocapra americana
Cervus canadensis



R.28 E.

R.29 E.

R.30 E.

WATER QUALITY MONITORING (Field Analysis)

Stream/Lake Lower BlueWatershed Planning Unit Lower Blue Unit No. 9Location 2.5 mi. downstream from F.R. 275 about 1/2 mile from Blue RiverCollection Date 9/22/69 Temp., (water) _____ °FWidth of Stream (sampling stat.) 22 ft. Depth of Stream (sampling stat.) 10 in.Substrate: Mucky _____ Sand _____ Gravel ☒Rock ☒ Boulder _____ Rubble _____Shade (percent) 10 Time 09:15 AM
PM

SQUARE FOOT BOTTOM SAMPLE (2 samples per station)

Combine both samples as one bottom fauna measurement per station. Count only the larger organisms (identified with naked eye) and record number of each group.

- | | |
|--|--|
| 1. TRICHOPTERA (caddisfly) <u>15</u> | 6. ODONATA |
| | Anisoptera (dragonfly) _____ |
| 2. EPHEMEROPTERA (mayfly) <u>3</u> | Zygoptera (damselfly) _____ |
| 3. DIPTERA (trueflies): | |
| Tipulidae (crane fly) _____ | 7. OLIGOCHAETA (aquatic earthworm) _____ |
| Culicidae (mosquitoes) _____ | 8. GASTROPODA (snails) _____ |
| Simuliidae (blackflies) _____ | 9. PELECYPODA (clams) _____ |
| Tendipedidae (midges) _____ | 10. DECAPODA (crayfish) _____ |
| Other _____ | 11. COLEOPTERA (beetles): |
| | Dytiscidae (pred. diving beetles) _____ |
| 4. PLECOPTERA (stonefly) _____ | Hydrophilidae (water scavengers) _____ |
| 5. HEMIPTERA (bugs): | Gyrinidae (whirligigs) _____ |
| Hydrometridae (treaders) _____ | Other _____ |
| Gerridae (striders) _____ | |
| Notonectidae (back swimmers) _____ | |
| Belostomatidae (giant water bug) _____ | |
| Corixidae (boatman) _____ | |

REMARKS:

BY:

W. Matt & John Munn

R-3 USFS

FOREST AgaveWATER QUALITY MONITORING
(Field Analysis)Stream/Lake Lower BlueWatershed Planning Unit Lower Blue River Unit No. 9Location Woods near Laguna F.R. 475 T. 2S R. 31E Sec. 6
where it crosses Blue River

Collection Date <u>9/22/69</u>	Temp., Air <u> </u> °F
Collection Time <u>09:15</u>	Temp., Water <u> </u> °F
Analysis Date <u>9/23/69</u>	Temp. Range (Min.) <u> </u> (Max) <u> </u>
Sample Number <u>1</u>	Dates of Temp. Range <u> </u> To <u> </u>

(Parts Per Million Unless Indicated Otherwise)

*1. Alkalinity (PHTH) <u>0</u>	*14. Iron <u>.05</u>
(M.O.) <u>200</u>	*15. Manganese <u>.75</u>
*2. Carbon Dioxide <u>44</u>	16. Nitrate <u>16-Nitrate</u>
*3. Chloride <u>5.5</u>	*17. Oxygen, Dissolved <u>6</u>
4. Chlorine <u>0</u>	*18. pH <u>8.5</u>
5. Chromate <u> </u>	19. Phosphate, Ortho <u>4.4</u>
*6. Copper <u>.20</u>	Poly <u> </u>
7. Cyanide <u> </u>	*20. Sulfate <u>15</u>
8. Detergents <u>0</u>	*21. Total Dissolved Solids <u> </u>
9. Fluoride <u> </u>	*22. Turbidity <u>10</u> Units.
*10. Hardness, Calcium <u>150</u>	*23. Flow <u>15 cfs</u>
Total <u>190</u>	24. Weather <u>Clear</u>
11. Hydrogen Sulfide <u> </u>	25. <u> </u>
12. <u> </u>	26. <u> </u>
13. <u> </u>	27. <u> </u>

-Over-

WORK SHEET

Revised 4/68

R-3 USFS

FOREST Appaloosa

WATER QUALITY MONITORING (Field Analysis)

Stream/Lake Elmer CreekWatershed Planning Unit Elmer Creek Unit No. 6Location Doyle road over from F.R. 217 where it first crosses ElmerCollection Date 9/22/69 Temp., (water) _____ °FWidth of Stream (sampling stat.) 10 ft. Depth of Stream (sampling stat.) 2 in.Substrate: Mucky _____ Sand ☒ Gravel ☒Rock ☒ Boulder _____ Rubble _____Shade (percent) 50 Time 10:45 AM
PM

SQUARE FOOT BOTTOM SAMPLE (2 samples per station)

Combine both samples as one bottom fauna measurement per station. Count only the larger organisms (identified with naked eye) and record number of each group.

- | | |
|--|--|
| 1. TRICHOPTERA (caddisfly) <u>7</u> | 6. ODONATA |
| | Anisoptera (dragonfly) _____ |
| 2. EPHEMEROPTERA (mayfly) _____ | Zygoptera (damselfly) _____ |
| 3. DIPTERA (trueflies): | |
| Tipulidae (cranefly) _____ | 7. OLIGOCHAETA (aquatic earthworm) _____ |
| Culicidae (mosquitoes) _____ | 8. GASTROPODA (snails) _____ |
| Simuliidae (blackflies) _____ | 9. PELECYPODA (clams) _____ |
| Tendipedidae (midges) _____ | 10. DECAPODA (crayfish) _____ |
| Other <u>Belostomatidae</u> | 11. COLEOPTERA (beetles): |
| | Dytiscidae (pred. diving beetles) _____ |
| 4. PLECOPTERA (stonefly) _____ | Hydrophilidae (water scavengers) _____ |
| 5. HEMIPTERA (bugs): | Gyrinidae (whirligigs) _____ |
| Hydrometridae (treaders) _____ | Other <u>18-20 misc. beetles</u> |
| Gerridae (striders) _____ | |
| Notonectidae (back swimmers) _____ | REMARKS: <u>"</u> |
| Belostomatidae (giant water bug) _____ | |
| Corixidae (boatman) _____ | BY: <u>Thistle & John Munn</u> |

R-3 USFS

FOREST ApacheWATER QUALITY MONITORING
(Field Analysis)Stream/Lake Eagle CreekWatershed Planning Unit Eagle Creek Unit No. 6Location 30 yds upstream from FIR 217 T. 15 R. 28E Sec. 32
and first crossing of Eagle Crk.

Collection Date <u>9/22/69</u>	Temp., Air <u> </u> °F
Collection Time <u>09:50</u>	Temp., Water <u> </u> °F
Analysis Date <u>9/23/69</u>	Temp. Range (Min.) <u> </u> (Max) <u> </u>
Sample Number <u>2</u>	Dates of Temp. Range <u> </u> To <u> </u>

(Parts Per Million Unless Indicated Otherwise)

*1. Alkalinity (PPTH) <u>0</u>	*14. Iron <u>1</u>
(M.O.) <u>230</u>	*15. Manganese <u>125</u>
*2. Carbon Dioxide <u>41</u>	16. Nitrate <u>42</u>
*3. Chloride <u>175</u>	*17. Oxygen, Dissolved <u>6</u>
4. Chlorine <u>05</u>	*18. pH <u>8.7</u>
5. Chromate <u> </u>	19. Phosphate, Ortho <u>4</u>
*6. Copper <u>35</u>	Poly <u> </u>
7. Cyanide <u> </u>	*20. Sulfate <u>3</u>
8. Detergents <u>02</u>	*21. Total Dissolved Solids <u>310</u>
9. Flouride <u> </u>	*22. Turbidity <u>0</u> Units.
*10. Hardness, Calcium <u>100</u>	*23. Flow <u>7 cfs</u>
Total <u>150</u>	24. Weather <u>clear</u>
11. Hydrogen Sulfide <u> </u>	25. <u> </u>
12. <u> </u>	26. <u> </u>
13. <u> </u>	27. <u> </u>

-Over-

WORK SHEET

Revised 4/68

Stream/Lake Lower Little River Watershed Planning Unit Lower Little RiverUnit No. 0 Location Antelope River in Lower Little River

Collection Date	4/1/00	4-2-00	5-2-00	6/1/00						
Temperature, (Water)	61°	—	69°	—						
Width of Stream (ft.)	18	35	26	22						
Depth of Stream (in.)	19	15	4	10						
Substrate	bedrock	bedrock	56% SGP	56% SGP						
Shade %	5	25	40	10						
Time	12:00	10:30	8:20	7:45						
1. Trichoptera (caddisfly)			3	15						
2. Ephemeroptera (mayfly)	12	3	2	3						
3. Diptera (trueflies):										
Tipulidae (crane fly)										
Culicidae (mosquitoes)										
Simuliidae (blackflies)										
Tendipedidae (midges)										
Other (See specific report)										
4. Plecoptera (stonefly)		16								
5. Hemiptera (bugs):										
Hydrometridae (treaders)										
Gerridae (striders)										
Notonectidae (back swimmers)										
Belostomatidae (giant water bug)										
Corixidae (boatman)										
6. Odonata:										
Anisoptera (dragonfly)			3							
Zygoptera (damselfly)										
7. Oligochaeta (aquatic earthworm)	1	1	2							
8. Gastropoda (snails)		1								
9. Pelecypoda (clams)										
10. Decapoda (crayfish)										
11. Coleoptera (beetles):										
Dytiscidae (pred. diving beetles)										
Hydrophilidae (water scavengers)										
Gyrinidae (whirligigs)										
Other (See <u>Antelope</u>)	2		4	2						
REMARKS	Antelope River	Antelope River	Antelope River	Antelope River						

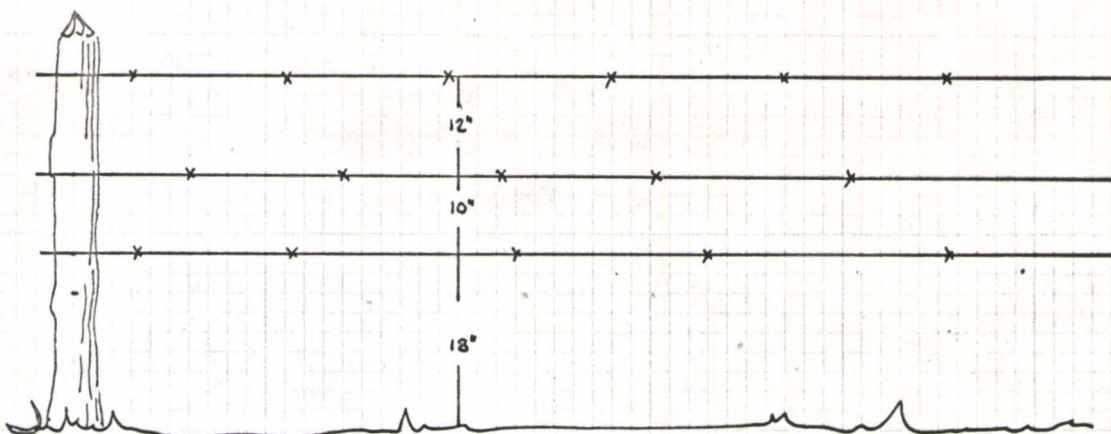
BY: Tom SmithFOREST Opache

STATION:

Location: Coffman Millers Road

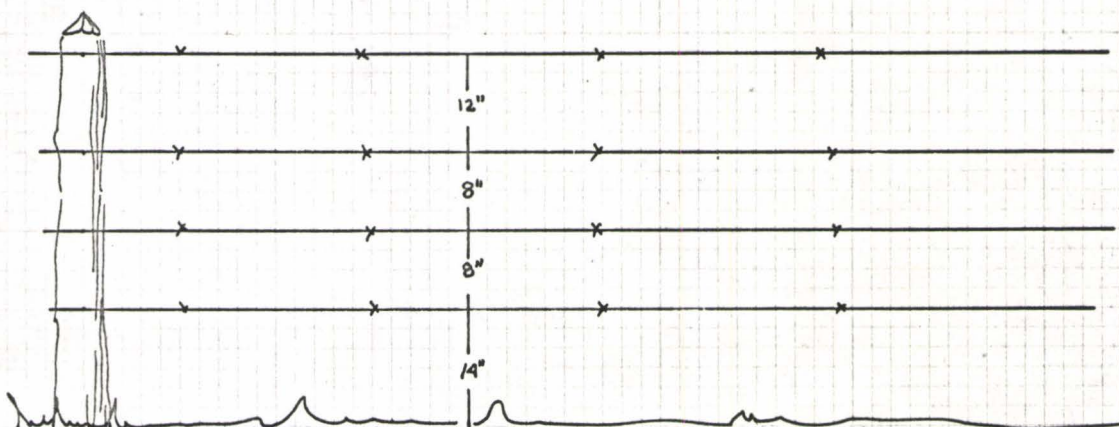
Parts Per Million Unless Indicated Otherwise

Sample Date	Day	Month	Year	Sample No.
				Air Temperature
				Water Temperature
				1. Alkalinity (PPM) (PHTH) (M.D.)
				2. Carbon Dioxide
				3. Chloride:
				4. Chlorine:
				5. Chromate:
				6. Copper:
				7. Detergents:
				8. Flouride
				9. Hardness, Calcium Total
				10. Hydrogen Sul-fide
				11. Iron
				12. Manganese
				13. Nitrate
				14. Oxygen, Dissolved
				15. pH
				16. Phosphate, Ortho Poly
				17. Silica
				18. Sulfate
				19. Turbidity Units
				20. Flow
				21 Weather
				Collected By
				Analysis By
				Remarks (Color, Odor,



STANDARD 3 WIRE FENCE

18" height allows for antelope and deer access while top height of 40" allows easy crossing for deer and elk.



STANDARD 4 WIRE HEIGHT OF 42"

Recommended height is 42" - 4 wire fence for allotment boundary fences and where heavy cattle pressure is exerted. 3 wire height of 40" is recommended for all interior division fences of allotments.